

REMARKS

Initially, Applicant wishes to thank the Examiner for the detailed Office Action and for the Notice of References cited therein. Applicant would also like to thank the Examiner for acknowledging Applicant's claim for foreign priority as well as receipt of a certified copy of the priority document upon which Applicant's claim for foreign priority is based, from the International Bureau. In addition, Applicant would like to thank the Examiner for indicating consideration of each of the documents cited in the Information Disclosure Statements filed on July 17, 2006, November 27, 2006 and December 8, 2006.

In the Office Action, the Drawings stand objected-to as lacking a designation such as ---Prior Art--- in Figures 1-4. Claims 1-15 stand objected-to for informalities. Claims 1, 5-9, 11 and 15 stand provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1, 7, 9-12, 14 and 18 of co-pending Application No. 10/576,273. Claims 1-5 and 9-15 stand rejected under 35 U.S.C. §102(b) as being anticipated by MEYERS (EP 0809124). Claims 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over MEYERS in view of DELLWO et al. (U.S. Patent No. 7,390,532).

Upon entry of the present amendment, independent claim 9 and dependent claims 2-8 and 10-14 will have been amended and claims 1 and 15 will have been cancelled. In particular, independent claim 9 will have been amended to recite features substantially similar to features previously recited in now-cancelled dependent claim 15. Further, independent claim 9 will have been amended to replace the recitation of "said light-transmitting film" with ---a light-transmitting film of said plurality of light-transmitting films--- and to replace the recitation of "the plurality of said light-transmitting films" with ---said plurality of light-transmitting films---. In addition dependent claim 11 will have been amended to replace the recitation of "light-

collecting devices” with ---light-collector---. The cancellation of claims 1 and 15 renders the objection to these claims moot. Thus, Applicant respectfully submits that the Examiner’s objection to claims 1-15 is addressed and reconsideration and withdrawal of the objection to claims 1-15 is respectfully requested. The amendments to independent claim 9 and dependent claims 2-8 and 10-14 and the cancellation of claims 1 and 15 should not be considered an indication of Applicant’s acquiescence as to the propriety of any of the outstanding objections or rejections. Rather, Applicant has amended independent claim 9 and dependent claims 2-8 and 10-14 and cancelled claims 1 and 15 to advance the prosecution and to obtain an early allowance of the claims in the present application.

Also upon entry of the present amendment, four Replacement Sheets of Drawings that include Figures 1-4, which are designated with the legend ---Prior Art---, are submitted. Thus, the Examiner’s objection to the Drawings will have been addressed. Accordingly, reconsideration and withdrawal of the objection to the Drawings is respectfully requested.

Applicant respectfully traverses the provisional rejection of claims 1, 5-9, 11 and 15 on the ground of non-statutory obviousness-type double patenting. Applicant submits that it is premature to file a Terminal Disclaimer in the present application insofar as the claims in the present application or ‘273 co-pending application may be amended during prosecution such that the claims between the two applications become (even more) patentably distinct. For example, upon entry of the present amendment, independent claim 9 will have been substantively amended resulting in the claims in the present application being patentably distinct from the ‘273 co-pending application, eliminating the need to submit a Terminal Disclaimer in the present application. Accordingly, it is submitted the requirement for filing a Terminal Disclaimer should be withdrawn.

However, if the Examiner still believes a Terminal Disclaimer is necessary, such requirement should be waived until such time as the claims in the present application are finalized and indicated to be allowable, and all other substantive rejections are withdrawn. In view of the above, Applicant respectfully requests reconsideration and withdrawal provisional rejection of claims 1, 5-9, 11 and 15 on the ground of non-statutory obviousness-type double patenting.

Applicant respectfully traverses the rejection of claims 1-5 and 9-15 under 35 U.S.C. §102(b) as being anticipated by MEYERS and the rejection of claims 6-8 stand under 35 U.S.C. §103(a) as being unpatentable over MEYERS in view of DELLWO.

According to an aspect of the present claimed application, a plurality of light-transmitting films have concentric zones with an arbitrary line width that is equal to or shorter than a wavelength of incident light. That is, the present application is directed to modulating the refractive indices of light-transmitting films and a solid-state imaging apparatus including effective refractive index distribution lenses that have different refractive index distributions for each unit pixel.

An optimal effective refractive index distribution for each unit pixel allows each unit pixel in the periphery of a solid-state imaging apparatus to collect incident light efficiently and achieve the same sensitivity as unit pixels located at the center of the solid-state imaging apparatus, even when incident light enters obliquely with a large angle of incidence with respect to the vertical axis of the incident surface. Typically, shortening the focal length of an optical system of an imaging lens decreases the size (*e.g.*, the thickness) of a digital camera. However, when incident light enters at the periphery of a solid-state imaging apparatus such as a charge-coupled device (CCD) or metal oxide semiconductor (MOS) sensor (*i.e.*, enters at an incident

angle), the sensitivity of the solid-state imaging apparatus deteriorates at the periphery of these devices. The present application, and in particular, the combination of features recited in Applicant's independent claim 9 addresses the decrease in light-collection efficiency occurring as a result of a wider incidence angle of light.

The Examiner asserts MEYERS as teaching the claimed combination of features recited in Applicant's amended independent claim 9. In this regard, Applicant submits that MEYERS discloses a convex lens and an aperture, as well as a short focal length image sensor formed by an array of photosensor sites and a lenslet array. MEYERS is further submitted to disclose that each lenslet has an optical axis that is de-centered as a function of its radial position in the lenslet array. The Examiner acknowledges that MEYERS does not disclose that zone widths must be equal to or shorter than a wavelength of the incident light, but asserts that this is an inherent property of refractive lenslets. The Examiner further asserts the equation on page 5, line 5 of MEYERS as teaching that a plurality of light transmitting films form an effective refractive index distribution.

However, Applicant respectfully submits that MEYERS fails to disclose or render obvious that, in a unit pixel, among said unit pixels, which is located at a center of a plane on which said unit pixels are formed, a position at which an effective refractive distribution of a corresponding light-collector is a maximum value matches a central axis of a corresponding light-receiver and, in a unit pixel, among said unit pixels, which is located at a periphery of the plane, a position at which an effective refractive distribution of a corresponding light-collector is a maximum value is displaced from a central axis of a corresponding light-receiver toward the center of the plane, as recited in Applicants' amended independent claim 9. In contrast, Applicant respectfully submits that Figure 1 of MEYERS illustrates each lenslet at the outer

edges of the lenslet array has an optical axis that is de-centered away from the center of the lenslet array.

Applicant additionally notes that in MEYERS, symmetrical and asymmetrical effective refractive index distributions are not formed in light-transmitting films, which have zones having arbitrary line widths equal to or shorter than the wavelength of incident light. Further, the structure of MEYERS collects light via changes in refractive indices and a structure that does not appear to realize an optimal effective refractive index distribution for each unit pixel by shifting the position at which the refractive index distribution is greatest towards the center of the sensor at which the incident light is incident.

In view of the above, Applicant respectfully submits that MEYERS fails to disclose or suggest at least the above-noted features of Applicant's independent claim 9 and thus, Applicant's independent claim 9 is allowable over MEYERS.

Further, each of dependent claims 2-8 and 10-14 are submitted to be allowable at least because they depend from independent claim 9, which Applicant submits has been shown to be allowable. Each of dependent claims 2-8 and 10-14 are also submitted to recite further patentable subject matter.

With respect to the 35 U.S.C. §103 rejection of claims 6-8, it is submitted that DELLWO fails to cure the deficiencies of MEYERS noted above with respect to independent claim 9, from which claims 6-8 depend, nor is DELLWO applied to cure the above-noted deficiencies. As such, allowance of dependent claims 6-8 is submitted to be proper for at least the same reasons noted above for independent claim 9, upon which they depend, in addition to reasons related to their own recitations.

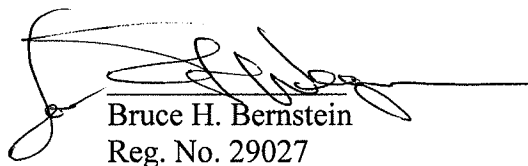
In view of the above, reconsideration and withdrawal of the rejection of claims 1-5 and 9-15 under 35 U.S.C. §102(b) as being anticipated by MEYERS and the rejection of claims 6-8 under 35 U.S.C. §103(a) as being unpatentable over MEYERS in view of DELLWO is respectfully requested.

At least in view of the herein contained amendments, remarks and Replacement Figures, Applicant respectfully requests reconsideration and withdrawal of each of the outstanding objections and rejections, together with an indication of the allowability of all pending claims, in due course. Such action is respectfully requested and is believed to be appropriate and proper.

Should an extension of time be necessary, the Commissioner is hereby authorized to charge any additional fee to Deposit Account No. 19-0089.

Should the Examiner have any questions concerning this Response or the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully Submitted,
Kimiaki TOSHIKIYO



Bruce H. Bernstein
Reg. No. 29027

August 6, 2009
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191

Steven Wegman
Reg. No. 31,438